



The reACT₂ant

Fall
2007-
2008

Fall Flip Flop

Volume 15 Issue #1

This fall marks the first time in many years that our calendars have been so radically altered. Thanks to the legislature, we had a long summer but now we may pay the price when fall semester exams won't happen until January. For some of who have been around a while, as teachers or as students, that may stir some unpleasant memories. As a teacher in the late 80's and early 90's I remember hating the week before Winter Break when I had to coax, beg, cajole and threaten to have my classes accomplish anything meaningful because other classes seemed to only have time for holiday parties. Then, the return in January meant facing a roomful of blank faces as we tried to review an entire semester's worth of work in one week.

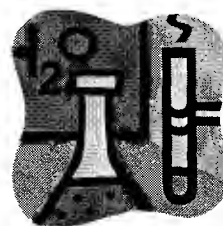
With that in mind, I tried to fill this issue with lots of ideas for labs, activities and puzzles that you could peruse to may be help make your last school week in December a little more bearable. *Everything has its own* holiday twist but obviously you may need to edit a little based on your school population. Thanks to Ed Escudero and Melissa Jones for their generous donation of lab activities. If you want to have some good holiday-related demonstrations to do the last day or so, you can also order Flinn's *Chemistry of Christmas* kit and get instructions for 7 different demos and enough chemicals to do each demo 7 times.

The Chemistry Carols have been well-circulated throughout the years and I'm not sure who actually gets credit for their authorship. Many ACT₂ folks will recognize them as a vital part of George Hague's presentations. I love singing with my classes throughout the year and while my classes do some "caramoling" on October 23rd, I imagine we'll squeeze in some chemistry caroling in December too. I would suggest having each class come up with its own version of the 12 Days of Chemistry (although I never allow any variation on 5 golden moles!).

You could also have teams in each class come up with a challenge activity for another team that includes something for each of the 12 Days of Chemistry and requires reviewing topics from the fall semester. For example: write 12 element symbols that start with C and their names...draw dot diagrams for the last 11 elements in period 5....write the 7

colors of visible light in order of increasing frequency...calculate the mass of 5 moles of gold...use the 3 most abundant isotopes of carbon to calculate its average atomic mass...write the electron configuration for element 100, etc. Hopefully something will tickle your fancy and make that last week a little more bearable and maybe even a little more fun.

You can expect our next issue will have lots and lots and lots of information about the upcoming Biennial in 2008. Rhonda Alexander is busily organizing a great conference in rose country, Tyler. The call for proposals will be here before you know it, so be thinking of an idea you would like to share. If you're shy, the biennial is a great place to get your presentation feet wet. Even if you don't think you have any original ideas, keep in mind that we always have new teachers to welcome to the profession and for them, everything is new!



Inside this Issue:

Call for
Nominations.....

....2

Other Tidbits.....3

CAST Austin 2007.....4,5

Silvering Ornaments.....6,7

Chemistry Carols.....8-10

Miscellaneous Madness.....11

Metallurgical Ornaments..12,13

Chemistree Puzzle.....14

Call for Nominations



The Board is also looking for folks who would be interested in running for an office on the Executive Board for the 2008-2010 term. Voting will take place at the Biennial Conference. If you would like more information regarding responsibilities, time commitment, or you want to get your name in the hat, now, contact Roxie Allen.

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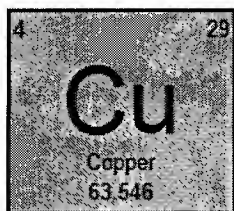
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ChemEd 2007 Highlights

I'm still looking for some folks to donate a summary of one of their ChemEd sessions for ongoing Chem highlights. I really can't write for sessions I wasn't able to attend, so please help. Besides, if you're like me, there's a good chance that all of your ChemEd stuff is sitting in a pile/folder/bag somewhere because you really haven't sorted through it. This is a good opportunity for you to look through it. Remember I need a short paragraph that summarizes what you saw and enjoyed. Email it to me (act2smith@mindspring.com). Be sure to include the presenter's name and workshop title so I can give them appropriate credit. If you're not quite sure of the exact session title or presenter, I can probably figure it out from my program descriptions. If you need an example—look back in the Early Fall edition of the newsletter or email me. Thanks—Jane

The National Academy of Sciences has created a new website ***www.iwaswondering.org*** that features the accomplishments of contemporary women in science as well as information on the variety of scientific careers that students can pursue. The site draws from *Women's Adventures in Science* which is a middle-school biography series chronicling the lives of today's working female scientists. In addition to interactive information about real scientists, there are also interactive games and suggestions for engaging girls in the science classroom.



L. cuprum, Cyprus
known since prehistoric times
mp 1083°C bp 2567°C



Copper artifacts date back from ten thousand years. Alloys of copper—brass (Cu + Zn) and bronze (Cu + Sn) are sometimes historically confused with copper. To the alchemists copper was the symbol of Venus. Copper is an excellent conductor of electricity—second only to silver. The electrical industry is one of the greatest consumers of this element. The sulfate of copper, known to alchemists as blue vitriol, is used as an agricultural poison and as an algicide. Fehling's solution, copper tartrate, is used in analytical chemistry as a test for sugar.

From *Rediscovering the Elements* by Dr. Jim Marshall, University of North Texas

Local note: Arizona and New Mexico are big copper mining regions. ASARCO is a major refinery for copper and has one of its big plants outside Amarillo!

Seasonal note: Copper flame tests are beautifully green and pine cones or kindling soaked in copper salts make lovely green flames in your home fireplace.

Join the Science Teacher's Association of Texas in celebrating the 50th anniversary of CAST—the Conference for the Advancement of Science.

"Celebrate the Past—Imagine the Future"

Here are some other CAST sessions I found in the program that looked like they might appeal to Chemistry folks:

THURSDAY, November 15

- Motivating Lab Activities That Bring Real-World Problem Solving Into Your Applied Biology/Chemistry
- My Best Chemistry & Physics Lessons
- Chemistry of Materials
- Lets Blow Something Up (...Not Really!!) : The Method To Our Madness!!
- Dive in with Physical Models: Exploring the Properties of Water
- Explore and Experiment with Lyondell Chemical Company
- Countertop Chemistry

FRIDAY, November 16

- Flinn ChemTopic Labs Workshop—Experiments and Demonstrations in Chemistry
- Toys—They're Not Just for Physics Anymore
- Applied Biotechnology in the Classroom: Hands-on Tools and Tips
- Increase Conceptual Student Learning in Chemistry and AP Chemistry—with PASCO Probeware
- Conserving Chemicals Using Small Scale Chemistry
- Science - It's a GIRL Thing: The Chemistry of Perfume!
- Elements on the Wall- A Student's Perspective of the Periodic Table
- Teaching the Solid State of Chemistry
- Dimensional Analysis Manipulative
- Motivating, Engaging and Success!! Chemistry for ALL Students
- Why does Water go Up and Down in a Toilet?
- Dynamic Demonstrations from Flinn Scientific
- The Air-O-Dynamic Curriculum
- Applying Nanotechnology in the Classroom: Hands-on Tools and Tips
- Physics and Chemistry Demonstrations

ACT₂ Presents...**FRIDAY, November 16**

Clipping Along: Modeling 2-D and 3-D Bonding Patterns

9:00 – 10:15 ACC-Level 3-Room 6A Diana Mason Carmen Fies

Ideas That Work in Teaching Chemistry

9:00 - 10:15 ACC-Level 3-Room 6B Barbara Schumann Eva Lou Apel

A Demo A Week Makes Science Class The Peak

12:30 – 1:15 ACC-Level 1-Ballroom B Vinay Dulip Jeanne O'Leary
Carlos Montalvo

Take Home Labs: Will It Float, Snowflakes and More!

2:00 – 3:15 ACC-Level 3-Room 6A Amiee Modic Jane Gray

What? You mean I'm teaching science?

2:00 - 3:15 ACC-Level 3-Room 6B Ken Lyle

How to Balance Your Equation, and Eat It, Too!

2:00 - 3:15 ACC-Level 2-Room ML10 Elizabeth Gregory Mary Ann Baker

Fun and Games in Chemistry

3:45 – 5:00 ACC-Level 3-Room 6B Jane Smith Claudia Wallace

SATURDAY, November 17

Second Semester Topics

9:00 – 10:15 ACC-Level 1-Room 3 Janet Dickinson

Supporting TAKS with Chemistry Lab Activities and Manipulatives

10:45 – 12:00 ACC-Level 1-Room 3 Heather Hattori Paula Robinson

ACT₂ Share-a-thon

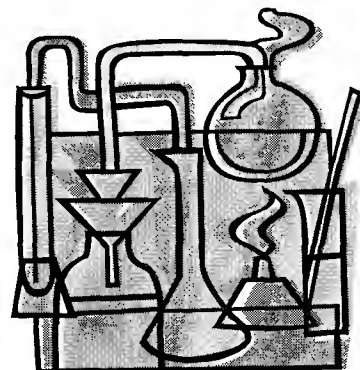
2:45 – 4:00 ACC Level 1 Ballroom C

ACT₂ Luncheon Speaker**Kenneth Lyle, PhD**

Lecture-Demonstrator

Department of Chemistry

Duke University

*Chemical Demonstrations:**A means to motivate students, foster understanding
of chemical concepts, and share the joy of doing chemistry*

Mirror silvering may be used as a review of the mole concept and as a fun exercise in preparation for Christmas. The silver is deposited using a variation of the Tollen's test. This test has been discussed by Shakhashiri¹, and the method published by Bennet². The experiment may be performed as a qualitative exercise in which a striking silver ornament is produced or as a quantitative exercise utilizing mole calculations.

Materials: Use deionized water. Once prepared, the solutions are shelf stable.

Solution (A) Sucrose, Tartaric Acid, and Ethanol: Dissolve 25.0 g of sucrose in 250 ml of water and add 3.0 g of tartaric acid. Boil the solution for ten minutes, cool, and then add 50 mL of ethanol. Dilute to 500 mL. (0.15 M sucrose, 0.040 M tartaric acid, and 1.70 M ethanol)

Solution (B) Silver Nitrate and Ammonium Nitrate: Dissolve 20.0 g of silver nitrate and 30.0 g of ammonium nitrate in water and dilute to 500 mL. (0.24 M silver nitrate and 0.75 M ammonium nitrate) Store in an amber bottle. The solution is light sensitive.

Solution (C) Sodium Hydroxide: Dissolve 50.0 g of sodium hydroxide in water and dilute to 500 mL. (2.50 M NaOH)

Procedure: (*The qualitative procedure does not require any of the masses and subsequent calculations.*)

Safety considerations: Wear goggles! These chemicals are very caustic and can also cause stains. Use chemical resistant gloves when covering the hole in the globe with one's thumb or finger.

Obtain a clear glass globe. Carefully remove the "gold" colored hanger. The globes are brand new and do not need to be washed. *Using the analytical balance, record the mass of the unsilvered clear glass globe to the nearest 0.0000 g.*

Using a distilled water bottle, rinse the interior of the previously massed clear glass globe. Swirl the water in the globe making sure that all of the interior surface is rinsed. Pour out the distilled rinse water. Carefully add one mini-beral pipet³ full of solution A (treated sucrose), followed by one mini-beral pipet full of solution B (silver nitrate). Cover the opening of the globe with your gloved finger or thumb and swirl the contents wetting the entire interior surface of the globe. Then add one mini-beral pipet full of solution C (sodium hydroxide). Add solution C quickly, cover the opening of the globe with your gloved finger or thumb, mix and swirl the solutions making sure all of the inside surface of the globe is bathed with the solutions. Keep rotating the globe making sure the reagents cover the inside surface until an evenly distributed shiny silver coating appears throughout the globe.

Uncover the opening, pour any remaining liquid into a labeled waste container and thoroughly rinse the globe with distilled water. Make sure all of the dark grey particles of residue are washed out. Rinse again with a small amount of acetone. Pour the acetone into the "used" acetone container. It will be reused. Invert the globe; allow any remaining acetone to

drip out; place the globe in the incubator/drying oven and allow it to dry for several minutes. (As an alternative, heat the globe carefully with a hot air gun and allow it to cool to room temperature.) Remove the globe from the incubator. Use a micro towel to grasp the globe. Allow it to cool to room temperature. *Weigh and record the mass of the silvered globe.*

Carefully replace the gold colored hanger and clean the outer surface of the globe with a glass cleaner. The globes may be further decorated using "puff" or fabric paints. You now have a unique ornament!

Data table:

<i>Mass of empty, dry globe:</i>
<i>Mass of dried globe and mirror:</i>

The globes are spheres with a radius of 3.37 cm (This will vary depending on the source of the globes.) The density of silver metal is 10.5 g/cm³.

Calculations:

- 1. Determine the mass of silver deposited on the globe.*
- 2. Calculate the number of moles of silver deposited on the globe.*
- 3. Calculate the number of atoms of silver deposited on the globe.*
- 4. Calculate the total surface area of the silver.*
- 5. Calculate the volume of silver.*
- 6. Calculate the thickness of the mirror.*
- 7. Calculate the volume of a single silver atom.*
- 8. Calculate the radius of a single silver atom.*
- 9. Calculate your % error. (The empirical radius of a silver atom is 160 pm)*
- 10. Calculate the thickness of the silver mirror in terms of number of silver atoms.*

Hints and Precautions:

- Glassware to be mirrored must be scrupulously cleaned. Use of the new globes purchased at Michael's or other craft stores assures a new/clean surface. Other glass bottles, (e.g. water, wine, vodka bottles) can be silvered with striking results. The glassware should be washed thoroughly with a soap/cleaning solution (Alconox). An added rinse with nitric acid may be necessary. In one instance, a hydrofluoric acid rinse was used. Wear gloves and work in a hood when handling the cleaning acids. An alcoholic- KOH rinse will remove any grease or oils. None of these more drastic rinses should be attempted by the students.
- The size of the container will determine the volume of reagents needed. A thin stem pipet may be used for the larger bottles. In each instance, always use equal volumes of the three solutions.
- Do not allow the residue from the silver-mirroring step to dry. It is a contact explosive. All literature references indicate that the proper disposal procedure for the residues is to flush them down the drain with a copious supply of water.

References:

¹Shakhashiri, Bassam. Chemical Demonstrations: A Handbook for Teachers. Madison, WI: U. of Wisconsin Press, 1983. Vol. 4. 11.28 Formation of a Silver Mirror. Pp. 240-243.

²Bennet, H., Ed. The Chemical Formulary. Van Nostrand: New York, 1935; Vol 2, p 242.

³Flinn Chemical and Biological Catalog Reference Manual 2007 (the mini-beral pipets used were purchased from Flinn Scientific - Micro tip, small AP2082 (bulb draw approx 1 mL). For larger (up to 1 L bottles), use Thin stem, AP1718 (bulb draw approx 3.5 mL))

WE WISH YOU A HAPPY HALOGEN

We wish you a happy halogen
We wish you a happy halogen
We wish you a happy halogen
To react with a metal.

Good acid we bring
to you and your base
We wish you a Merry Molecule
and a Happy Halogen



TEST TUBES BUBBLING

Test tubes bubbling in a water bath
strong smells nipping at your nose.
Tiny molecules with their atoms all aglow
will find it hard to be inert tonight.

They know that Molecule is on his way
He's loaded lots of little electrons on his sleigh
And every student's calculator is on the sly
To see if the teacher can really multiply.

And so I'm offering this simple phrase
To chemistry students in this room
Although it's been said many times many ways
Merry Molecules to you.

THE CHEMISTRY TEACHER'S COMING TO TOWN

You better not weigh
You better not heat
You better not react
I'm telling you now

THE CHEMISTRY TEACHER'S COMING TO TOWN.

She's collecting data
She's checking it twice
She's going to find out
the heat of melting ice

THE CHEMISTRY TEACHER'S COMING TO TOWN.

She sees you when you're decanting
She knows when you titrate
She know when you are safe or not
So wear goggles for goodness sake!

Oh you better not filter
and drink your filtrate
You better not be careless and spill
your precipitate

THE CHEMISTRY TEACHER'S COMING TO TOWN.



OH CHEMIS-TREE

O Chemis-tree, Oh Chemis-tree
 How brightly burns your Bunsen
 The sight of thee at Chemis-tree tide
 Spread fear of all mad scientists far and wide.
 Oh Chemis-tree, Oh Chemis-tree
 Thou hast a wondrous message:
 Beware of all crazy potions
 and your teacher's grand explosions.
 Oh Chemis-tree, Oh Chemis-tree
 : a wondrous message.



LAB REPORTS

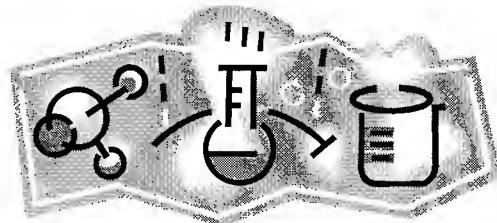
Dashing through the lab
 with a ten page lab report
 Taking all those tests
 and laughing at them all (ha ha ha)
 Bells for fire drills ring
 making spirits bright
 What fun it is to laugh and sing
 a chemistry song tonight.
 Oh lab reports – lab reports
 reacting all the way
 Oh what fun it is to study
 for a chemistry test today – hey!
 Chemistry test – thinking test
 isn't it a blast
 Oh what fun it is to take
 a Chemistry test and pass!

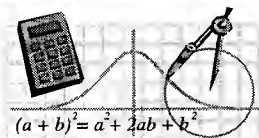
DECK THE LABS

Deck the labs with rubber tubing
 Fa la la la la la la la la
 Use the funnel when you filter
 Fa la la etc.
 Don we now our goggles and aprons
 Fa la la etc.
 Before we go to our lab stations
 Fa la la etc.
 Fill the beakers with solutions
 Fa la la etc.
 Mix solutions for reactions
 Fa la la etc.
 'Watch we now for observations
 Fa la la etc.
 So 'we can collect our data
 Fa la la etc.

WE WISH YOU A
HAPPY HALOGEN

We wish you a happy halogen
 We wish you a happy halogen
 We wish you a happy halogen
 To react with a metal.
 Good acid we bring
 to you and your base
 We wish you a Merry Molecule
 and a Happy Halogen!



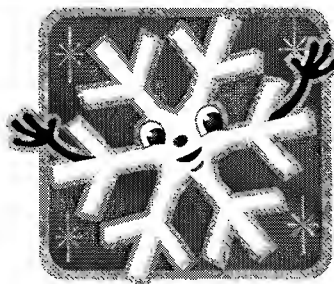
SILENT
LABS

Silent labs – difficult labs
 All with math– all with graphs
 Observations of colors and smells
 Calculations and graph curves like bell's
 Memories of tests that have past...
 OH, how long will chemistry last?

Silent labs – difficult labs
 All with math– all with graphs
 Lots of equations that need balancing
 Gas pressure problems that
 make my head ring
 Santa Chlorine's on his way
 Oh– please Santa bring me an "A"

THE TWELVE DAYS OF
CHEMISTRY

On the first day of Chemistry
 My teacher gave to me
 A candle from Chem study
 (Second day) Two ceramic pads
 (Third day) Three little beakers
 (Fourth day) Four work sheets
 (Fifth day) Five GOLDEN MOLES
 (Sixth day) Six flaming test tubes
 (Seventh day) Seven unknown
 samples
 (Eighth day) Eight homework
 problems
 (Ninth day) Nine grams of salt
 (Tenth day) A ten page test
 (Eleventh day) Eleven molecules
 (Twelfth day) A twelve point Quiz

CHEMISTRY
WONDERLAND

Gases explode are you listen'n
 In your test tube silver glistens
 A beautiful sight we're happy tonight
 Walking in a chemistry wonderland.

Gone away is the buoyancy
 here to stay is the density
 A beautiful sight we're happy tonight
 Walking in a chemistry wonderland.

In the beaker we will heat lead carbonate
 and decide if what's left is nitrate.
 My partner asks, "Do we measure it in moles
 or grams?"
 and I'll say, "Does it matter in the end?"

Later on as we calculate
 the amount of our nitrate
 We'll face unafraid
 the precipitates we made
 Walking in a chemistry wonderland.



Here are a variety of websites I found with potential activities or labs you could use the week before break.

Try making snow globes by exploring the proper mix of liquids for the desired viscosity.

http://www.ehow.com/how_17515_make-snow-globe.html

<http://www.allfreecrafts.com/christmas/snow-globe.shtml>

Food labs are always popular with students. Make sure that you have brand new glassware to use or use alternatives that can be cleaned and sterilized. Sometimes your Home Economics department might be willing to trade rooms with you for a day so you can use their stoves. Microwaves are a little easier to handle in a classroom. A nice science connection is to provide all of the ingredients in forms that students will have to convert before they can measure.

Peppermint Wafers <http://chemistry.about.com/od/holidayhowtos/ht/peppermint.htm>

Peanut Brittle <http://chem.lapeer.org/Chem1Docs/>

Nancy Clark, who is retired from Bristol-Plymouth Regional Technical School in Taunton, Massachusetts has an amazing website with activities for every holiday. Her winter offerings include: a candy cane lab, a white powders mystery lab, a chromatography experiment, chemical reaction demo with a holiday theme and a equation balancing challenge game.

<http://www.nclark.net/Holidays>

Here's a popcorn lab that incorporates water displacement to determine volume as well as the ideal gas law in order to calculate the percent of water in popcorn.

<http://intro.chem.okstate.edu/ChemSource/Gases/Lab2.html>

Here are a variety of silly Chemistry-related holiday jokes.

<http://www.xs4all.nl/~jcdverha/scijokes/Christmas.html>

Here's one that you might want to bookmark. It is a website that allows you to download a variety of game formats written using Power Point templates.

<http://facstaff.uww.edu/jonesd/games/index.html>

INTRODUCTION:

Decorating for the holidays has a long tradition. When decorations are handmade their value is even more lasting. In this lab you will be combining your artistic talents with chemistry know-how to create an ornament that will bring you pleasant memories of chemistry for years to come.

In Part A you will be making the hook for the ornament. To do this you will be comparing and contrasting the processes of annealing and tempering to determine which will make the better hook for your ornament.

In Part B you will be creating the ornament itself from an aluminum roof cap and a solution of copper(II) sulfate through a single replacement reaction. The aluminum will react with copper ions, copper metal forms on the surface of the aluminum. The aluminum is silver colored and the copper is orange. The difference in color is used to create an interesting pattern or design.

PURPOSE: To compare and contrast the process and results of tempering and annealing.
To use the chemical properties of copper and aluminum to create a metal ornament.

MATERIALS:	bobby pins	roofing caps	stirring rod	0.05 M CuSO_4
	bunsen burner	masking tape	nail	
	hammer	tubing	utility knife	wire beaker
	striker	paper towel	tongs/forceps	acrylic sealer

SAFETY : *Wear goggles and an apron.*
 CuSO_4 is an irritant. Avoid skin contact with this chemical. Wash your hands thoroughly after use.
Utility knives are very sharp. Handle with care.

PROCEDURE:**Part A**

1. Fill a 250 mL beaker with water.
2. Hold a bobby pin securely using tongs or forceps over a Bunsen burner flame. Heat until it is glowing red. Drop the hot pin into the water and let cool.
3. After the pin has cooled, take and shape into a hook.
4. Take a second bobby pin and using tongs or forceps heat it over a Bunsen burner flame. Heat the pin until it is glowing red.
5. Place the pin on the bench top and let it cool slowly.
6. After the pin has cooled, take and shape into a hook.

Part B

7. Take the nail and hammer and make a hole in the top edge of the roofing cap.
8. Completely cover both sides of the roofing cap with masking tape.
9. Draw a design on the masking tape with a pencil. If you want, you may draw designs on both sides of the roofing cap.
9. Use the utility knife to cut and remove the masking tape so your designs are uncovered.
10. Take the best hook you made in **Part A** and poke it through the hole so it does not come out.

11. Place the roofing cap into the beaker with CuSO_4 . Hook the pin over the stirring rod and suspend it in the solution.
12. When the entire area of the design has been coated with copper, rinse it with water and dry it with the paper towel.
13. Remove the masking tape from the piece of iron.
14. Coat the piece with acrylic sealer by holding the piece by the hook under a fume hood and spraying both side with sealer.

DATA:

Part A	Fast Cooling (tempered)	Slow Cooling (annealed)
Observations		
Part B	Reactants $\text{Al} + \text{CuSO}_4$	Products
Observations		

CONCLUSIONS:

1. Compare and contrast a piece of metal that has been tempered and annealed.
2. When would you prefer a piece of metal to be tempered?
3. When would you prefer a piece of metal to be annealed?
4. Write and balance the chemical reaction that took place in this lab.
5. Identify the type of reaction this reaction represented.
6. What evidence was there that there was a chemical reaction taking place?
7. What was the purpose of the masking tape?
8. Sketch the design you placed on your ornament.
9. Place your name on the ornament and turn it in along with this lab sheet.



CHEMISTREE PURSUITS



USE YOUR PERIODIC TABLE TO FIGURE OUT THE FOLLOWING CLUES USING EITHER ONE OR TWO LETTERS FROM THE ELEMENT SYMBOLS. A SECRET MESSAGE WILL BE REVEALED!!!!

- _____ 1. named for our country but in reverse
- _____ 2. has an outer electron configuration of $4d^1$
- _____ 3. atomic number 70 minus atomic number 5
- _____ 4. 2nd period with 6 valence electrons
- _____ 5. named for the 7th planet of our solar system
- _____ 6. middle element of the VIIIB groups
- _____ 7. 76 protons minus 16 protons
- _____ 8. slightly lower ionization energy than beryllium
- _____ 9. $4d^{10}$ minus $2p^2$
- _____ 10. corrosion-resistant metal minus 92 protons
- _____ 11. atomic weight of 88.906 amu
- _____ 12. 5th period, +2/+4 ions minus 2nd period, -3 ion
- _____ 13. has smallest atoms of the alkaline earth metal
- _____ 14. highest electronegativity
- _____ 15. its atomic weight is greater than antimony's and less than tellurium's
- _____ 16. 2 times (gains 1 electron to be like Ar minus what diamonds are composed of)
- _____ 17. named for the originator of $E = mc^2$ minus a yellow nonmetal solid
- _____ 18. atomic weight closest to 12^2 minus gas that makes up 80% of the earth's atmosphere
- _____ 19. sounds like what snakes smell with or frogs catch flies with
- _____ 20. a gray, solid halogen that sublimates to form a purple gas
- _____ 21. actinide named for the Scandinavian god of thunder
- _____ 22. first letter of the element named for the father of the periodic table
- _____ 23. first letter of "_____ and Old Lace" (a movie)
- _____ 24. 2 times (atom with 22 electrons minus "a pair of eyes")
- _____ 25. sounds like the name of plants used in cooking and medicine

Write the complete message here: _____



2

Associated Chemistry Teachers of Texas MEMBERSHIP APPLICATION

(Current members should use this form to update information)

☐ NEW OR ☐ RENEW Date _____

Name _____
First Middle Last

E-Mail Address _____

School District _____ I.S.D. ESC Region _____

School Name _____ STAT Member ☐ Yes
☐ No

Home Address (where mail can be sent even during the summer)

Street City State Zip

Phone Numbers (include area codes)

() _____ () _____ () _____
Home School FAX

reACTant Info: (How would you like to receive the newsletter?)

☐ Electronic copy via Internet ☐ Hard copy via US mail

Job Description:

(Check all that apply)

- ☐ Teacher/Professor
☐ Department Head
☐ Principal
☐ Supervisor

Other _____

Job Location:

- ☐ High School
☐ Two-Year College
☐ University
☐ Other _____

Dues:

\$10.00 ☐ One Year Member, ACT₂
\$20.00 ☐ Two Year Member, ACT₂

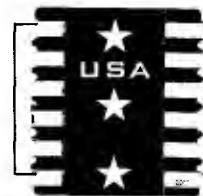
TOTAL PAID \$ _____

Make check payable to ACT₂

Mail to: Rosendo Garcia, ACT₂ Treasurer
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Pflugerville, TX 78660

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Check Date _____
Account Name _____
New Due Date _____



Associated Chemistry Teachers of Texas

Jane Smith, Editor

8400 Hickory St. #4701

Frisco, TX 75034

DUES DUE Life
*****AUTO**MIXED AADC 760
Barbara Schumann



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